

Sumitomo Corporation Global Research China's Innovation - Current Status and International Evaluation -

Research Report

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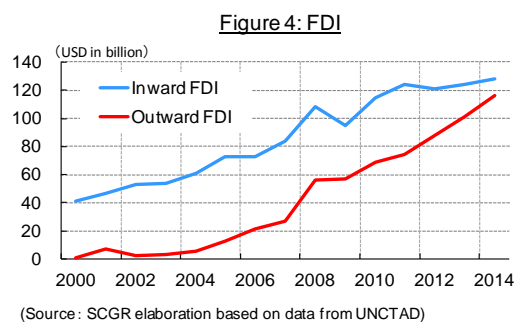
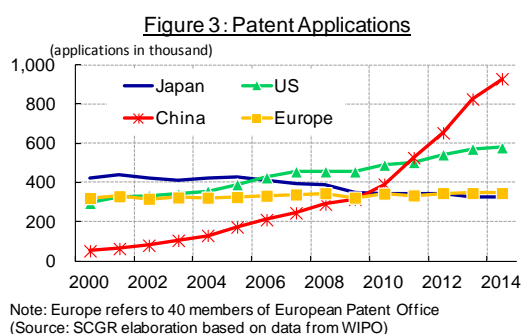
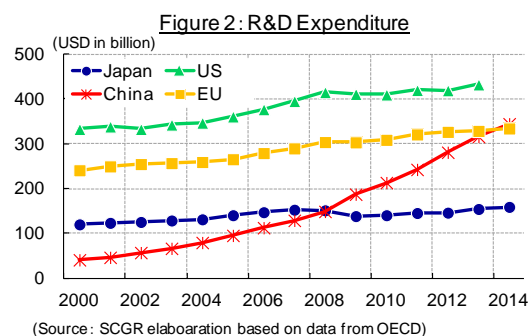
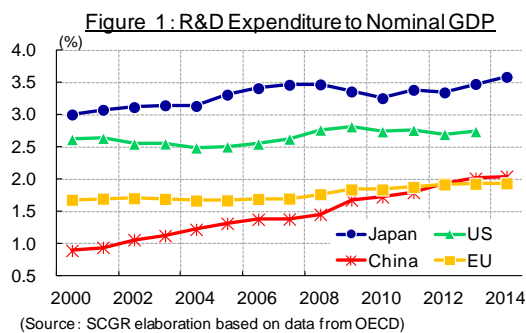
Eriko Katashiro, Senior Economist
Economic Analysis Dept.

China has strongly encouraged the acquisition of advanced knowledge together with research and development (R&D) in the process of ongoing structural change, dedicating to shifting to an innovation-driven economic model which is considered a prototype of most developed countries. In this context, the paper explains the current status and international evaluation of China's innovation.

Theoretically, innovation is perceived as "residual" among three drivers: capital, labor and innovation, to trigger economic growth. "Residual" innovation is called by Schumpeter "new combination" in: (1) products or quality; (2) production; (3) sales channels; (4) buy side; and/or (5) organization. In addition, innovation, which commonly distinguishes between an incremental and a radical one, must be welcomed in markets. Robert Slow points out that innovation is the most contributing driver to US economic growth among the three drivers. Furthermore, Edward Denison and Robert Barrow et al., provide an empirical study which proves innovation as the most contributing driver towards economic growth in the most developed countries¹.

◆ Current Status of Innovation

Firstly, the R&D Expenditure to Nominal GDP (Figure 1) shows the upward trajectory of China which had the highest growth among Japan, US, and EU² during 2000-2014. Japan had the highest percent at 3.6% in 2014. As shown the R&D Expenditure (Figure 2) as of 2014, China ranked second after the US, exceeding the EU, which amounted to USD 344.7 billion. Turning to Patent Applications (Figure 3), China became first from 2011 when it exceeded the US, increasing roughly 930,000 applications in 2014. China's outward FDI value rapidly rose, which is likely to reach the inward FDI value within the coming years (Figure 4). Regarding the inward FDI, the government has promoted to introduce advanced technologies in China in ways that have imposed a high import tariff for part of highly value-added products e.g., automobiles and have allowed foreign companies to invest in China only if they promote producing and selling products locally. In respect of the outward FDI, Chinese companies have proactively invested abroad, particularly increasing mergers and acquisitions (M&A) in Europe and the US to obtain intellectual property rights, technique and know-how³.



Eurasia group reports that with the economic slowdown, China has been proactively purchasing companies abroad, in various sectors. This was to boost an economy led by consumption, services and innovation,

¹ Schumpeter, Robert Slow, Edward Denison and Robert Barrow are US economists.

² EU is composed of 28 member states.

³ M&A abroad brings capital outflows as well, avoiding risks related to RBM depreciation.

shifting from an investment-led economy while in the 2000s or before state-owned enterprises (SOEs) had mainly bought overseas companies in the areas of natural resources e.g., coal, copper, iron ore and oil. For example, recently, Chinese companies have purchased overseas companies with high technologies to increase China's domestic food production and to make the industries of semiconductor and robots internationally competitive through upgrading. In addition, overseas companies in the areas of hotels, movies and sport teams have been bought by Chinese companies. The highest priority is to purchase companies with sophisticated technologies in the US and European countries rather than emerging countries.

In 1st quarter 2016, overseas acquisitions (announced cross-border transactions) conducted by Chinese companies accounted for approximately 15% or USD 101 billion out of USD 682 billion worldwide, putting China on track to surpass USD 109 billion in the entire one year of 2015. The value of this USD 101 billion includes, USD 43.8 billion, the price of ChemChina's pending acquisition of a Swiss seeds and pesticide supplier, Syngenta International AG, which is equivalent to approximately 1% of nominal GDP value in Japan as of 2015.

Innovation does not always happen and faces uncertainties. Although the number of patent applications has tremendously increased, some studies point out that new combinations or innovation activities among manufacturing have not yet been observed greatly. Furthermore, SOEs would be an obstacle to domestic competition which drives innovation since SOEs dominate the markets.

Developed countries such as Japan, US, and European countries are wary of technology outflows brought by Chinese M&A activities. For instance, the government of Germany carefully scrutinizes each of the projects planned by foreign companies to avoid the outflow of key technologies since German high-tech companies have increasingly confronted acquisitions by Chinese companies. Recent M&A activities conducted by Chinese companies include a proposed acquisition of a German robotics-industry leader, Kuka, by a Chinese home-appliance maker, Midea Group. However, German Chancellor Angela Merkel stated the possibility of counter offers made by German companies, although she would not have any intention of preventing a Chinese takeover of Kuka. The protection by developed countries against technology outflows is likely to increase, which is discouraging for Chinese companies looking to purchase overseas companies.

◆ International Evaluation of Innovation

The Global Innovation Index (GII)⁴ 2015 jointly published by the World Intellectual Property Organization (WIPO), Cornell University, and INSEAD ranks China 29th out of 141 economies. Within the first 30th, only China and Estonia are classified as emerging countries while the others are classified as developed countries (Figure 5)⁵. Forbes Magazine states eight world leading Chinese industries: micro payment; online shopping; delivery; online investment products; low-price smartphone; hydraulic power generation; DNA sequence; and high-speed railway, most of which are in the areas of internet and/or infrastructure (Figure 6). Furthermore, Forbes Magazine provides a ranking for the world's 100 most innovative companies in which six Chinese companies are listed: Baidu (computer science industry); Shanghai RAAS Blood Products (biotech industry); Tencent Holdings (computer science industry); Hengan International Group (household/personal care service industry); Tingyi Holding (food processing industry); and Want Want China (food processing industry).

Given the above current status and international evaluation, China appears to progress smoothly in the transformation of an innovation-led economy. However, the Global Competitiveness Report 2015-2016 published by the World Economic Forum allocates China into "Stage2: Efficiency-driven" country which is positioned in the third stage among the five stages of development: "Stage1: Factor-driven"; "Transition from Stage 1 to Stage 2"; "Stage 2: Efficiency driven"; "Transition from Stage 2 to Stage 3"; and "Stage 3: Innovation-driven". Thus, China needs to become more competitive to take two more stages to move to a "Stage 3: Innovation-driven" country in which most developed countries/economies are categorized. McKinsey & Company indicates that China needs to evolve from an innovation "sponge" to an innovation leader to keep GDP growth.

Figure 5: Global Innovation Index 2015

Rank (141 countries)	Country	Score(1-100)
1	Switzerland	68.3
2	UK	62.4
3	Sweden	62.4
4	Netherlands	61.6
5	US	60.1
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12	Germany	57.1
14	Korea	56.3
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19	Japan	54
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29	China	47.5
30	Portugal	46.6

(Source: SCGR elaboration based on data from Global Innovation Index 2015)

Figure 6: Eight China's Leading Industries in the World as of 2014

1	Micro Payment
2	Online Shopping
3	Delivery
4	Online Investment Products
5	Low-price Smartphone
6	Hydraulic Power Generation
7	DNA Sequence
8	High-speed Railway

(Source: SCGR elaboration based on data from Forbes)

⁴ The GII 2015 covers 141 economies around the world which are ranked by using 79 indicators across a range of themes e.g., institutions including political, regulatory and business environments, human capital and research, infrastructure, market and business sophistications, knowledge and technology outputs and creative outputs.

⁵ The classification is based on IMF definition.

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